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Technical Suggestions in the Use of Amalgam

E. Carl Miller, D.D.S.

AMALGAM has held a prominent position in dental materials research for years. This research has brought about a reasonable and practical method of management. Alloys that are above reproach are now being manufactured and sold with explicit directions in the matter of ratio and the manner and time of trituration. Therefore, the failure of amalgam cannot be attributed to the manufacturers of alloys which meet the standards of the Research Commission of the American Dental Association. Alarming as it must be to the members of a profession as prominent as dentistry, many amalgam failures are due to careless and irresponsible operative procedures.

In view of the fact that over 70 per cent of posterior fillings are made with amalgam, this material is without question one of the most important considerations in dentistry. It possesses a unique position in dental materials because, even if carelessly used and even misused, it can and does preserve teeth.

The growing interest in periodontia has stimulated a critical demand for restorations which produce the original proximal surfaces and adjacent contact of posterior teeth. Amalgam restorations carelessly built leave no doubt in the minds of meticulous operators that disastrous conditions of the supporting tissues are too commonly the result.

If postgraduate study could be directed to amalgam as it is to other phases of dentistry, I am sure that there would be a general improvement in this widely used material. It is quite apparent that the general attitude toward amalgam is that it is a fair restorative material, and because of economics it must be used. Were its management clearly understood and meticulous methods employed so that the patient could be assured usually of lasting, anatomical and functional results, amalgam would then enjoy a position comparable to that of the gold inlay.

FORMULAS FOR A GOOD AMALGAM RESTORATION

There are certain procedures in the management of amalgam that must be observed if reasonable results are to be expected.

1. The exact mercury-alloy ratio as specified by the manufacturer should be utilized.[1]

2. Trituration must be complete.[2-3]

3. Moisture contamination from handling, or a wet cavity, must be avoided.[4]

4. Fresh amalgam less than five minutes old and not crystallized should be used.[5]

5. The filling material should be similar from the floor of the cavity to the occlusal surface both as to consistency and the force of condensation.[3]

6. Mechanical disturbances such as a yielding matrix or careless carving must be avoided.[3-6]

7. The mercury content should be low; yet the consistency of each pack must yield excess mercury at the surface of each layer.[7]

8. Initial crystallization should take place before the removal of the matrix band and the final carving.

Read before the East End Branch of the Odontological Society of Western Pennsylvania, at Pittsburgh, April, 13, 1950.

Some of the material in this paper is based on a presentation given before the Operative Section, American Dental Association, at Boston, August 6, 1947.

9. The restoration should be polished at a later date when dimensional change is complete.[8]

RATIO AND TRITURATION

The use of scales adjusted for each particular alloy is a practical method of proportioning mercury and alloy. Since the ratio is specified by weight, it appears that this method is the correct one. Dispensers if adjusted can be used with confidence; yet the consistency of such allotments should be compared with amalgam made from correctly weighed ratio.

The mortar and pestle if used intelligently will triturate completely. The mortar should not have a raised center because it is more difficult to incorporate the alloy particles than in a round bottom mortar. These instruments should be roughened and should always be clean. It is good practice to place the contents from the mortar to a clean piece of rubber dam and mull for a few seconds. By twisting the rubber a few times with the thumb and finger the amalgam is mulled efficiently and rapidly. Quickly hitting the rubber sack containing the amalgam against the palm of the hand will instantly incorporate the mass into a sphere ready for use.

The thumb or finger of a rubber glove deserves our attention as an effective method of triturating alloy and mercury. By placing the mercury and alloy in a clean fingerstall and twisting the rubber so that mercury cannot escape, the contents can be rubbed into complete trituration in less time than can be accomplished with the mortar and pestle. Many fingerstalls should be available so that each may be cleaned and dried before each use.

The mechanical amalgamator properly regulated has won the approval of recent investigators.[9] It is time saving and gives the operator the opportunity to make multiple mixes for large restorations.[7]

CONSISTENCY OF AMALGAM

It should be generally understood that amalgam to be completely triturated must have mercury sufficient to coat every particle of alloy. Too often there is a tendency for operators to make an amalgam that is workable for condensation. Such a stiff mix cannot be properly amalgamated. The correct ratio which is generally sixty parts mercury to forty parts alloy should be utilized uniformly. Amalgam must have a packing resistance to be properly condensed. This consistency is easily obtained by expressing the excess mercury from each piece of amalgam before it is placed in the cavity for condensation. Freshly triturated amalgam rolled into a rope and cut into pieces will remain in an uncrystallized state longer than that which is mercury-expressed immediately. This allows the operator to use workable amalgam before initial crystallization. Properly triturated amalgam offers no crepitus upon rubbing.

Tingley [10] has suggested a good test for consistency. A sphere of amalgam dropped upon the bracket from a distance of a few inches should flatten one-half its diameter.

DANGERS IN TRITURATION

The manner of trituration can determine the failure or success of a restoration. It is equally as important as the cavity preparation, the matrix, the condensation, or the carving. Dirty mortars and pestles or fingerstalls and squeeze cloths can contaminate the new amalgam with old amalgam and other impurities which may cause corrosion. Untriturated alloy particles are also undesirable. For this reason it is well to mull the mass to be sure of complete amalgamation.[3] The research of Phillips and others [2] has verified the fact that there is more harm in undertrituration than by adding a few seconds to be sure that every particle is completely coated with mercury. Extreme

pressure with the pestle causing a grinding of the alloy particles into smaller particles will initiate contraction, according to the research of Gayler.[11] If mercury is added to amalgam after initial crystallization in order to make it workable, the filling will be weakened.

A good rule to follow is to observe the correct ratio, to triturate with a light force when using the mortar and pestle, and to have the utensils clean.

THE CAVITY

In previous papers[12-13-14-15] cavity preparation and its relation to the success of amalgam restorations has been described. I would like to plead for a serious consideration of this operative procedure. More time must be spent upon the elimination of weak tooth structure and upon the production of exceptional retention. Amalgam has a tendency to creep if not locked in the cavity. This cannot be classified as flow because that invariably is associated with occlusal stress. As an example, gingival restorations often exhibit clinical evidence of raised margins when there has been lack of retention.

Overhanging enamel and weak walls inevitably fracture because of the expansion of the amalgam. Considerable time should be spent in preparing a cavity which has a smooth outline, strong walls, and a flat floor.

GALVANIC AND THERMAL ACTIVITY

A tooth that is not comfortable should be considered pathological. Attention must be given to occlusal stress as well as to the protection of the vital tooth tissue. Thermal disturbances can be eliminated in most cases by the use of copal varnishes. Well condensed amalgam with low mercury content will cause no distress in a cavity of ideal depth. In deep cavities where there is close proximity to the pulp, it is necessary to protect this tissue by the use of base cements from the force of condensation, as well as from galvanic and thermal disturbances.

THE MATRIX BAND

The building of an amalgam restoration of more than one surface usually requires a form. The exceptions are occlusal extensions which will be discussed later.

The use of a mechanical matrix holder to adapt and hold the matrix band has given to the profession a difficult method to reproduce the proximal surfaces. The ordinary band is straight from the gingival to and above the marginal ridge. Roentgenological examination of amalgam restorations usually reveals that the unanatomically restored mesial or distal surfaces of bicuspids or molars meet the adjacent contact too high and that there is a general lack of the natural convexity in the marginal ridge area. Too often such a contact is lost through wear and such a surface permits a triangular interproximal space which allows food impaction from the lingual and buccal embrasures.

The typical banding material is 0.002 inch stainless steel. This material is obtainable in strips of $\frac{5}{16}$" or wider. It should be cut so that the top and bottom of the band is curved in parallel. The smaller curve naturally by its smaller circumference will hug the gingival thus allowing the larger circumference of the occlusal to conform to the wider area of the tooth. The band is contoured so that it will extend bucally and lingually, covering at least one-third of those surfaces. The band should extend well below the gingival to allow close adaptation of the wedge at the cavo-surface of the gingival floor. The band should extend well above the marginal ridge of the adjacent tooth.

SHAPING PROXIMAL CONTOUR OF BAND

The band is now ready to receive the proximal contour. With a pair of contouring pliers the marginal ridge area is carefully shaped so that it is convex, thus reproducing the original anatomy of the tooth. It is necessary to prepare special pliers for this procedure. Experience has demonstrated that to shape the stainless steel band the ordinary pliers usually buckle and crack the material. If the concavity side of the pliers is lined with lead solder this softer material permits the banding material to assume the desired shape without cracking, because the lead flows slightly under pressure.[16]

Banding material should be manufactured with a convexity of approximately one-third of its width. With this simple feature it is possible to construct a definite contact regardless of the type of matrix used.

THE WEDGE

Gingival adaptation of the matrix band demands a wedge inserted just below the gingival cavo-surfaces. A good wedge material is the common round toothpick. The sides of the toothpick should be sliced until it is triangular. It is then carefully inserted into the widest embrasure so that it presses against the band and the adjacent tooth equally. Exceptionally wide embrasures, which are encountered frequently between upper molars or teeth which have drifted, naturally demand a wider wedge. A tongue depressor can easily be carved into the shape desired. Such a wooden wedge will remain firm and can be made to conform to any tooth surface irregularities.

ADAPTATION OF WEDGE AND BAND

A stainless steel matrix band, firmly wedged, allows the operator the opportunity to re-shape its angles to the proximal walls of the cavity. By using a plastic instrument these angles may be slightly rounded and will meet the tooth structure in a manner which will allow overpacking of amalgam. At the same time the instrument should slightly push the band away from the gingival proximal angles for the same reason. Actually the band is held in close adaptation to the tooth in the middle two-thirds of the gingival.

Clinical observation has demonstrated that the weaknesses of the usual amalgam restoration are the proximal margins and the gingival proximal angles, especially the latter. This condition is in part due to the fact that the tight fitting band is held so firmly at these margins that overpacking is impossible and, therefore, the margins are mercury-rich and weak in structure. It is unthought of to pack amalgam just to the cavo-surface of the occlusal because we realize that well overpacked margins are condensed better and are not frail from too much mercury. In reality the multi-surfaced posterior amalgam filling should be overpacked everywhere except the middle two-thirds of the gingival where convenience form of the cavity allows proper condensation and the removal of liberal amounts of mercury excess.

REINFORCEMENT OF MATRIX

The matrix just described must be made firm so that there is no yielding from the force of condensation. Dental tape can hold firmly the band in the gingival region, but it is incapable of making the band immovable in the embrasure areas. Low fusing modeling compound is an ideal material for this purpose. In order to make it stick, the field must be completely dry. The compound becomes soft at low heat, and is easily adapted into the embrasures against the band, flowing into and completely filling the space and adhering firmly to the buccal and lingual surfaces of the adjacent teeth. It quickly sets into a rigid material, but also it is unique in that it will

respond to needed changes in contour by the application of a warm plastic instrument pressed against the band from the cavity side.

VALUE OF AN UNYIELDING FORM

We have known for some time that a form which yields, results in a far inferior restoration than one which was condensed in a firm unchanging matrix. The noticeable difference is the marginal ridge. This important anatomical area should be constructed without disturbance of the changing matrix wall. If the band is contoured and shaped with the usual marginal ridge convexity, after its removal the adjacent contact is well placed below the marginal ridge, thus allowing room for the carving of the occlusal embrasure.

REMOVAL OF MATRIX AND CARVING

Amalgam should be allowed to crystallize partially before it is carved and the matrix is removed. This assertion is reasonable because during the operation of building the multi-surfaced restoration, every effort has been made to avoid disturbance which will in any way disrupt the homogeneous well condensed structure.

The first portion of the matrix to remove is the compound, both the lingual and buccal portions, being careful not to disturb the band. The stainless steel band can and will offer an excellent guide in forming the marginal ridge and occlusal embrasure. By placing an explorer point against the band and removing the excess in that manner, there is no danger of careless carving in this important area. The carving can be continued on the occlusal, drawing the instrument blade in the direction of the cavity outline, guided by having the blade resting on the enamel margin. This safety measure permits the operator the liberty of meticulous carving without the danger of uncovering the marginal wall. We should be extremely careful in this operation because drawing a carver to or from a margin is a dangerous procedure. If the amalgam is too soft the material will drift with the motion of the instrument away from the marginal wall. Even in instances where the amalgam is partially set the carving blade can remove too much amalgam if drawn to or from a margin. The use of binocular loupes to magnify the field is a safe method. The carving blade should be sharp.

The matrix band is removed next. Due to its contour and the convexity of the proximal portion it is extremely important to remove it in the direction that it envelops the tooth. If drawn straight in a buccal or lingual direction it is apt to buckle where there is a natural bulge. If it is firmly gripped with pliers and drawn in the direction of its contour, the proximal contact will not be disturbed except to have a burnishing action in rounding the contact.

The uncovered proximal surface will demand carving of the proximal margins as well as the gingival proximal angles. If the cavity has been extended to clean areas this operation is not a diffcult procedure. Again the carving instrument should be drawn in the direction of the outline of the filling. A pledget of cotton pushed through the gingival portion of the proximal space will remove particles of amalgam which might adhere to the unset amalgam wall. If there is reason to be uncertain about the possibility of gingival overhang, an X-ray should be taken and interpreted immediately. There is usually no overhang if the wedge is properly adjusted, but disturbance during condensation can happen, and it is better to remove amalgam excess in this area before it is completely set, thus eliminating a difficult and painful procedure at some later date.

INTERCUSPAL RELATIONSHIP

To allow the patient to leave without adjusting the occlusal relationship may have disastrous results in the matter of fracture or trauma. The filling must be set enough to allow the use of carbon paper and the force of biting stress. If the restoration is extremely large and there is danger in this important step, retire the patient to the waiting room or another operating room until the filling is set enough to test the occlusion properly without danger.

CONDENSATION OF AMALGAM

Sweeney [7] has described clearly a method by which amalgam can be properly condensed with the use of correctly designed instruments. His practice of removing excess mercury before packing the amalgam has a twofold purpose—reducing the mercury content and making the amalgam resistant to forceful condensation. We all know that mercury-rich amalgam cannot be condensed. To start a filling with plashy amalgam creates a hardship upon the operator by contributing mercury excess that must be removed. If mercury-expressed amalgam is condensed on the floor of a cavity, and pressure seats the amalgam into the retentions and covering the floor we have accomplished an important mission. The filling is sealed in an important area.

Amalgam should not be too dry. There should be enough mercury excess so that each layer of condensed amalgam offers generous quantities of mercury which should be removed before it diffuses back into the filling. Sweeney's ledged instruments designed to remove mercury during condensation are an invaluable contribution to dentistry.

The removal of mercury is important. A filling of low mercury content is stronger than one which is mercury-rich. Too much mercury causes expansion and corrosion. This does not mean that amalgam should be dry and crumbly. A good test is to place the amalgam in a squeeze cloth, express a liberal amount, rub the amalgam in the cloth and press with thumb and finger; if mercury appears through the cloth the amalgam is not too dry. Another test is to condense the expressed amalgam in the cavity and if mercury appears at the surface of each layer there is an excess quantity.

It must be remembered that we are advised to build the structure so that each part is similar in consistency. Theoretically if the ratio of the amalgam is eight parts mercury to five parts alloy, two parts mercury should be removed by the squeeze cloth. One more part should be removed during condensation. Thus the filling itself should be five parts mercury and five parts alloy. This relative percentage of mercury and alloy varies considerably as is shown by Sweeney [7] whose skill in condensing amalgam with hand instruments resulted in much lower mercury content.

To summarize the building of amalgam fillings: amalgam should have a consistency so that it may be condensed; mercury excess should appear at the surface of each layer; the excess should be removed, but just enough should be left to bind the next layer; this process should be repeated until the filling is completed, including the overpacking.

OVERPACKING THE OCCLUSAL

The occlusal surface of bicuspids and molars offers two problems which make it difficult to condense uniformly with the conventional type of amalgam instruments. Usually when a generous amount of amalgam is added to the occlusal surface and the usual force is exerted, it will not condense with sufficient force against the margins. Such a method of occlusal overpacking exerts the most force to the highest surfaces of the uneven tooth structure. Again the irregular outline of

the occlusal presents a problem for flat-faced instruments. For some time the use of cotton pressed against the amalgam has in some way compensated for the surface and outline irregularities. A malleted pressure against a pellet of cotton or a wad of cloth or against rubber dam will exert a uniform force and cause the appearance of mercury excess. Using this method of condensation it is difficult to remove the mercury-rich amalgam before it diffuses back into the filling. We at the present time have instruments that are rubber faced [12] which will exert uniform pressure, and extreme force can be used without the danger of marginal injury. When the mercury appears at the surface, it conveniently can be removed immediately by the rubber condenser.

NEW INSTRUMENTS

In a previous paper [12] the need for more form instruments was stressed. The greatest need is for concave instruments for gingival cavities. As a rule there is too much disturbance of the restoration during packing and overpacking, and as a result the amalgam is not homogeneous. Such fillings corrode and distort.

One can expect a poor result if amalgam is packed against a very convex floor with a flat-faced instrument. Gingival floors when convex present mesial and distal depth which is necessary for volume as well as retention. Concave instruments which nearly cover the floor will condense the amalgam into the undercuts and when the cavo-surface is reached the filling is uniformly packed. Again overpacking is necessary to insure well condensed margins. A large concave overpacking instrument applied with extreme force such as can be applied with the pneumatic condenser will not injure the cavity margins due to the mat of amalgam which cushions the force of the blow. This creates a better surface than can be accomplished with a flat-faced instrument, due to the fact that there is no disturbance of the already condensed amalgam.

We should not be content with just one concave condenser for use in all cavities, but there should be various sizes for bicuspid and molar gingival cavities. Such a selection will allow the operator to condense small as well as extensive restorations properly.

OCCLUSAL EXTENSIONS

To date the author has used only three condensers which will conveniently pack amalgam into the occlusal extensions of the disto-lingual and buccal grooves. These angular shaped instruments which are called saddle points, are a valuable aid in overcoming a common problem. Fillings built with such form instruments definitely demonstrate the advantage of instruments which are so designed that they function as a matrix as well as a condenser.

THE DRY FIELD

It has been the purpose of this paper to enumerate the clinical advantages of certain operative procedures in building amalgam restorations. A homogeneous restoration should be made if possible, whether it be a gingival filling, or a multi-surfaced type replacing lost surfaces of posterior teeth. To build a homogeneous filling we must have a firm matrix or instruments which will not disturb the amalgam already condensed in occlusal extensions and gingival cavities. We can buy these instruments, but we cannot buy the Hollenback type of matrix which gives us so many advantages and which is the result of the ability and dexterity of our fingers. It demands a completely dry field. To date there is only one method of gaining a dry field of operation which will remain dry long enough to build a complete filling. This method is the use of the rubber dam.

The most preferable dam material in my opinion is the darkest made. This latex rubber if stored in a refrigerator will keep for a long time. Light colored rubber deteriorates quickly.

Molar and bicuspid clamps without wings are preferable. The S.S.W. No. 18 molar or the S.S.W. No. 22 bicuspid clamps are indispensable. For molar gingivals, the S.S.W. No. 24 and No. 25 left and right are useful. The Ivory anterior gingival clamp No. 9 is excellent for the bicuspid and cuspid gingival cavities. The S.S.W. No. 211 can be used for lower anterior cervical fillings.

The dam, cut to size and punched approximately one-eighth of an inch apart with holes large enough to envelop the teeth in one section of the mouth, should be lubricated with a high grade soap such as shaving cream. Soaping the gingival side allows the dam to slip easily over the clamp and through the proximal contacts of the teeth.

The use of the Young's frame which holds the dam away from the lips and face is an advantage because it affords air to circulate through the area of the mouth. Also the frame can be sterilized. This holder can be used in most instances, the possible exception being for very posterior teeth such as the third molars and some second molars where the frame may exert too much tension. In such cases we use the conventional type of holder.

It has been our experience that the use of the dam is a time saver once it is adjusted. In most cases the time involved in adaptation is of little consequence. One particular advantage is that this method controls young patients. The use of the rubber dam offers a clear dry field which permits the most meticulous operative procedures.

POLISHING

Amalgam restorations should be polished. There should be no over-hangs, and much care should be given to the proximal area to be sure that the contact with the adjacent tooth is rounded and not a flat plateau. By the use of a separator the contact can be polished with a smooth cuttle disc without damage to the firmness of adjacent relationship. In most cases the proximal surface is smooth because of condensation of the amalgam against the smooth matrix band, and therefore only the proximal embrasures need polishing. The use of the Woodbury barrel type plug finishing burs are advantageous in preparing the occlusal surface for polishing. The finishing bur is useful for polishing gingival restorations. The final polishing is accomplished with amalgam brushes designed to remove the scratches from the grooves and sulci, and wheel brushes for the high points. The abrasive pastes used are silex and water, and whiting and water.

Amalgam should not be polished until the dimensional change is complete. This usually takes five days or more. It must be remembered that to polish amalgam properly there should be no excessive heat. The brushes are used with quantities of wet paste, never allowing the paste to become dry.

CONCLUSION

An amalgam restoration which is well built, properly carved, and polished is worthy of the time and effort in its conservation of tooth structure. Its permanency is unquestioned in the opinion of many operators. Its value to the patient is comparable to any other restorative material used in dentistry. Its greatest value is its independence of cementation and the relatively low cost to the patient. With the general acceptance of the best methods in the management of amalgam, the use of better designed instruments, the use of the rubber dam, and the adoption of an unyielding matrix, amalgam should become more universally

used and more highly respected than it is at the present time.—*13859 Euclid Ave., East Cleveland 12, Ohio.*

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Dangers in the Use of Mouth Props and Gags

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FRED D. MILLER, D.D.S.

SOME years ago[1] I wrote an article for a medical journal stressing more care in the use of mouth props and gags when general anesthesia is being used. Now, fifteen years later, with an increasing number of dentists on hospital staffs using the operating rooms and the medical specialist still using mouth gags in throat operations, the warning can again be sounded.

A number of cases of fractured anterior teeth, resulting from the careless use of mouth gags, have occurred mainly because the operator has failed to appreciate the stress and strain applied in opening the jaws under anesthesia, has not well understood dental anatomy, and has not appreciated the value of a tooth and what may occur when the pulp is destroyed, either from trauma or fracture. A pulpless tooth still is a serious health hazard.

It should never be necessary to place a mouth gag on an anterior tooth unless there are no posterior teeth present and, in this event, certainly the mouth gag should be covered with rubber. The six anterior teeth of both maxilla and mandible are single-rooted and easily fractured by stress applied in the wrong direction. These teeth in children from five to eight years of age, usually the time of tonsillectomy, have very short roots. There is a case on record where a throat specialist, using a "rat-trap" type of gag on the permanent central incisors of a 6½-year-old girl, *pushed the centrals out.* This was a frightful calamity which certainly will affect the entire future of this child.

Clinical Medicine and Surgery, 42: 230-2, May, 1935.

Any dentist would know that when the crown of a tooth has just erupted there is little root formed. While this case is one of the saddest that has come to my attention, I have seen numerous cases where the damage done was irreparable although not so pathetic.

The teeth "is" a grinding mechanism that performs a valuable physiologic function, and should be so looked upon by all those who have the future physical well-being of the patient at heart, just as the heart "is" a functioning organ. The individual teeth are simply units in a complete grinding machine, and the most serious thing that can happen to this beautifully functioning organ is the loss of one of its units thus causing a disorganization of the entire function.

Also, from a purely esthetic standpoint, the loss of an anterior tooth is a serious matter adversely affecting either child or adult. From a psychologic view the child may acquire a serious inferiority complex as a result of the loss of even a single tooth. From a financial standpoint the restoration of an anterior tooth may cost as much as or more than the operation for the removal of the tonsils.

The life of any dental restoration is problematic, depending on the extent of involvement; and, in the event of *loss* of a tooth, the pulp in the adjoining teeth may ultimately be jeopardized and the replacement of one or more teeth may have to be repeated over and over again, involving a constant source of annoyance and loss of time and money for the patient.

Infection is no respecter of location. An infected tooth is just as serious as infected tonsils, and probably more insidious because many pulpless, infected teeth are comfortable teeth, giving the patient no warning—no pain, no discomfort, no soreness—while appearing innocent.

POINTS OF CARE

1. Where possible, the mouth gag (at least a small rubber wedge) should be placed before the anesthesia is started.

2. It should be comfortably adjusted, with rubber tubing covering the metal parts which may come into contact with the teeth.

3. It should be applied to the posterior (multi-rooted) teeth *only*.

4. A hickory-wood wedge should be used in the event it is necessary to pry the jaws apart. This, too, should be applied to the posterior teeth carefully and firmly.

5. If only the anterior teeth are present, dentists should be able to construct a special metal or acrylic splint to cover the teeth and to distribute the stress, thus preventing loosening or fracture. This, however, would be a rare occasion, but the extra care would be well worth while from the patient's point of view.

The throat specialist and the anesthetist should know enough about dental anatomy to be sure that no permanent tooth is likely to be pushed out or fractured. Extra care should be taken where teeth are irregular, carious, or dentition is delayed. In a difficult or unusual case, or with an edentulous patient, the cooperation of the dentist should be sought.

One should not wait until arrival in the operating room and then use "any old thing." Be prepared; be alert; keep in mind the patient's future! When a mouth prop is being used or the jaws are being forced open, remember those anterior teeth. The price of good teeth is eternal vigilance. Dentists, as well as medical specialists and anesthetists, should heed that statement.—*1122 12th Avenue, Altoona, Pa.*

Correction and Classification of Mandible for Maximum Stability of Denture

E. T. Lewis, B.S., D.D.S.

MUCH has been written concerning the stabilization of the lower denture. Each particular theory advanced has been an important link which has helped to form that long chain of thought aimed toward the construction of better dentures. In my practice I have followed the teachings of Fournet in order to simplify my technique. In the present paper I will elaborate on that theory in the hope of adding still another link to the chain. I will not go into detail on the various steps in lower denture construction, but will confine my observations to the subject as stated in the title.

I interpret the functional boundary of the denture as the most over-extended boundary that the muscles and attachments will tolerate. With that in mind the location of the proper boundary and floor level is necessary in order to establish maximum stability. Therefore one must recognize the important areas during the first oral examination regardless of whether the patient presents before extractions or in the edentulous state. It is to our advantage to examine the patient before extractions because then we can either make or recommend corrections that will give us maximum stability.

When we examine a mouth carefully, the following conditions may be revealed; some must be corrected before maximum results can be obtained:

High and thin ridge—A ridge of this type should be reduced. An alveolectomy is almost always necessary.

Flabby ridge—The loose tissue forming this type of ridge should be removed.

High lingual frenum—Since this is the most important area, the controlling area, particular notice should be made as to whether the frenum attachment is high or low on the alveolar ridge. If the frenum attachment is high, it will be difficult and in many cases impossible to establish a favorable seal in the final impression. Therefore we should surgically release the lingual frenum from the alveolar ridge.

Prominent or "rolling" retromolar pad—This should be reduced especially since this area is part of the supporting area.

High muscle attachments—In the event that such attachments are highly functional, it is imperative that they be released.

Buccal fold or supporting area—This area is second in importance and should be understood thoroughly. There are two types. One is flexible, being the functional type, with its attachment on the front or anterior portion of the pterygomandibular ligament. This type provides a deep under-surface which extends to the external oblique ridge and which covers the heels and distobuccal areas of the denture base; incidentally this is a favorable condition and aids greatly in maintaining stability. The other type is the taut or non-functional buccal fold. This is unfavorable because it does not produce a post-dam seal and has its attachments on the side of the pterygomandibular ligament and practically in line with the external oblique ridge with no under-surface.

Sub-lingual area from 1st bicuspid to 1st bicuspid—Undoubtedly this is the prime area of importance and must be understood thoroughly in order to evaluate the ultimate results. The height of the ridge is not important; in fact, it is a detriment to the final result in most cases. One must bear in mind that in order to obtain maximum stability a correct floor level or boundary must be established; one that is long enough to establish a perfect seal when the tongue is in full function, and yet not irritate the floor of the mouth. The *position* in which the tongue puts the anterior lingual floor of the mouth during *function* is what gives *maximum stability* rather than the boundaries of the tongue. The posterior lingual area is not important except that if too long the denture will be displaced when the tongue is in function. Therefore it is imperative that this area remains non-controlling rather than controlling which only happens if the flanges are too long or contact the mylohyoid muscles on the interior surface of the flange.

The ideal lower—This is a ridgeless one with a floating gland; that is, with the gland high and over the ridge. This gives a perfect seal. Another ideal lower is one having a sub-lingual fold and fold space. The correct boundary is easily obtained, giving you maximum stability. This type of case can be detected easily since the sub-lingual fold and fold space may be seen regardless of what position the tongue is in. Still another ideal lower is one having an undercut on the anterior ridge area with the sub-lingual floor area rising toward the submaxillary duct openings without a genio-tubercle under it. A lower, with the same condition, having a taut sub-lingual floor without a genio-tubercle, is also a simple case.

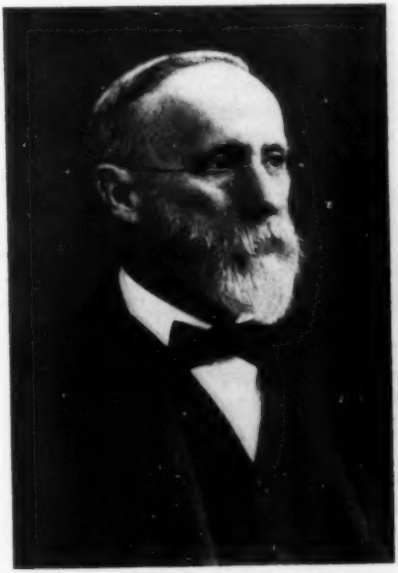
The most difficult lower—This is where there is a high or prominent genio-tubercle. This is determined by sight or by placing the index finger directly over the area which is between the sub-maxillary duct openings (the two eyes) and the alveolar ridge. It is difficult to obtain a proper seal in this area because the boundary must be a precision one and within a millimeter of being correct. If this boundary is even slightly over-extended, the patient will not tolerate it; if the boundary is slightly short the seal will break when the tongue goes into function. To correct this type of ridgeless lower with a high genio-tubercle is a simple operation. An incision is made from cuspid to cuspid, directly over the ridge, the tissue is retracted posteriorly to expose the tubercle, and it is removed. All bone spicules must be removed.

Next in difficult cases in the lower is the *draping-floor type*. This type varies depending on the degree of draping. The sub-lingual fold and space is present only when the tongue is raised or placed just below the approximate incisal edge—when it is in functional position. The most difficult of the draping-floor types include one where there is a slight tubercle, and another where the tongue is in an awkward or retracted position when in rest or during function. If the proper floor level is not established in these cases, results will be disappointing. In these cases, the floor of the mouth will tolerate a longer flange; indeed it is surprising just how much it will tolerate. If a precision floor level is selected so that the denture has maximum stability when the tongue is in functional position the patient will be a happy one.

In conclusion, it must be stressed that unless one becomes familiar with and understands the conditions described it is difficult to establish true and lasting peripheral boundaries. The failures in the lower denture are due largely to having no definite plan of boundary outlines. If a lower denture is constructed with adhesion, suction, and a full functional pe-

riphery with horizontal stability, you will eliminate many hours of practice by the patient in learning to "juggle" the appliance and to control the muscles and tongue in order to hold the denture in place.—*4117 Jenkins Arcade, Pittsburgh.*

Pennsylvania's Dentist of the Half-Century



MATTHEW HENRY CRYER, D.D.S., M.D.

MATTHEW H. CRYER was born at Manchester, England, July 11, 1840. At the age of 11 his family came to the United States, settling in Ohio.

In 1861 he enlisted in the Sixth Ohio Volunteer Cavalry, receiving a 2nd Lieutenant's commission two years later. He raised a new company for the regiment in 1863 and shortly became 1st Lieutenant. In 1864 he was promoted to Captain becoming company commander serving with Sheridan's Cavalry Corps. He participated in many important battles; he was wounded at Deep Bottom, Virginia. He was appointed Major in April, 1865, and was present at Lee's surrender.

Matthew Cryer received the D.D.S. degree from the Philadelphia Dental College in 1876, and a year later the M.D. degree from the University of Pennsylvania. He began teaching immediately. For twenty years he was Lecturer on Mechanical Dentistry, Philadelphia Dental College; he was Chief of Clinic for Professor Garretson at the Hospital for Oral Surgery, 1880-95; and Adjunct Professor of Oral Surgery, Philadelphia Dental College, 1895-96. In 1896 the School of Dentistry, University of Pennsylvania, formed a new chair of Oral Surgery, which position Dr. Cryer filled until 1917 when he retired because of age and was appointed Emeritus Professor of Oral Surgery. When his successor entered the service in World War I, Dr. Cryer patriotically resumed his teaching duties until the war was over.

In 1900 Dr. Cryer was appointed Visiting Oral Surgeon of the Philadelphia Hospital (now the Philadelphia General Hospital); he organized the dental service there including internships, which are believed to be the first dental internships in the United States. At this hospital, from 1901-18, he held a weekly oral surgical clinic, which became justly famous both here and abroad and was attended by students from all the dental and medical schools of Philadelphia.

From the early '80s, dental literature was continously assisted by his pen; his papers and volumes received immediate recognition as being authoritative. His researches on the normal and abnormal anatomy of the skull, together with his many specimens, have been quoted and exhibited throughout the world. No better judgment of his work can be asked than the continuous use of his illustrations and reference to his investigations by authors on anatomy and oral surgery. His researches culminated in the publication, 1901, of *Studies of the Internal Anatomy of the Face;* a second edition appeared in 1910. In this work, much light was thrown on hitherto obscure problems associated with anatomical variations of the nasal accessory sinuses and other parts of the skull. Dr. Cryer was the inventor of the surgical engine, an electrically driven instrument for cutting bone; this was employed by surgeons for many years, including W. W. Keen and Charles H. Frazier in their cranioplastic operations. Dr. Cryer also devised the still popular universal upper and lower extraction forceps and the root elevators that bear his name.

Dr. Cryer was a member of the Academy of Stomatology of Philadelphia, president in 1898-9; Pennsylvania State Dental Society, president in 1902; American Dental Association; American Medical Association; American Association for the Advancement of Science; Philadelphia Dental Club; Pathological Society of Philadelphia; Philadelphia County Medical Society; Grand Army of the Republic; Military Order of the Loyal Legion of the United States; Union League of Philadelphia; and the Psi Omega Fraternity. He was an honorary member of the New York State Dental Society and of the Sociedad Odontologica Espaniola; in 1914 he was elected to the British Dental Association, and at that time was the sole representative from the United States.

Dr. Cryer died August 12, 1921; aged 81.

The Board of Trustees selected the name of Dr. Cryer to represent Pennsylvania in that section of the Mid-Century Issue of the ADA *Journal* titled "Notable Contributors to Fifty Years of Progress." (See *J. A. D. A.*, 40: 733, June, 1950.) The above was the source article for the ADA sketch.—T. McB.

PENNSYLVANIA
DENTAL JOURNAL

JUNE 1950

EDITORIALS

THE ANNUAL MEETING

THE 82nd Annual Meeting of the Pennsylvania State Dental Society convened at Bedford Springs, June 18, 1950. The Board of Trustees met the day before. This was entirely a business and administrative meeting. The scientific sessions of the American Dental Association—October 30 to November 2 at Atlantic City—will take the place of the usual Society sessions. A full report of all activities, both of the House and of the Board, will be published in the next (October) issue of the JOURNAL. Only a few items are presented now.

The list of officers for 1951 will include Paul E. Bomberger, Lancaster, president; Fred Herbine, Reading, president-elect; J. E. Whittaker, Williamsport, and J. W. Lynam, Johnstown, vice-presidents; Miles D. Zimmerman, Pottsville, secretary; T. J. McFate, New Castle, assistant secretary; Dale M. Wampler, Harrisburg, treasurer; and Ray Cobaugh, Harrisburg, executive secretary. W. Earle Craig, Pittsburgh, will become ADA trustee. LeRoy M. Ennis, Philadelphia, will be nominated for president-elect of the ADA.

The Pennsylvania delegation to the ADA at the Atlantic City meeting will consist of the following: *Delegates*—H. K. Willits, P. E. Bomberger, A. C. Young, H. K. Cooper, R. M. Walls, Fred Hoeffer, T. F. McBride, H. C. Metz, A. L. Ventura, A. A. Booth, Ray Gates, George Coleman, T. P. Fox, and J. F. Scull. *Alternates*—John Looby, Z. T. Jackaway, C. S. DeLong, W. D. Everhard, George Hutter, Harry Mesjian, Harrison Berry, W. J. Robinson, Howard Curtis, Frank Geer, Isaac Sissman, Charles Gaige, J. A. Law, C. P. Marbarger, R. W. Jewells, and Zane A. W. Green. These delegates were elected at the 81st Annual Meeting held at Pittsburgh, June, 1949. One delegate from each of the ten districts, elected by the district, will be added to this listing. The delegation which will represent Pennsylvania at the Washington, D. C. meeting in 1951 were elected at the Bedford Springs meeting; that list will appear in the October JOURNAL.

The Pennsylvania Award for 1950 will be presented to Chris S. Van Horn, Bloomsburg, because of his contributions to dental art, science and literature. Dr. Van Horn will receive the Award at a later date at appropriate ceremonies.

Monday, October 30, at Atlantic City, will be "Pennsylvania Day." Our State Society, the third largest constituent of the ADA, will be host to the delegates, alternates, and official groups of the parent associaion. This will be Pennsylvania's big day. A complete outline of the function will be prepared by the chairman, W. Earle Craig, for the next issue of the JOURNAL.

Many other important actions of the legislative body of the State Society took place at Bedford Springs. Because of the mid-month date and dead-line restrictions of the JOURNAL, little except the above could be included at this time. The meeting, and all actions, will be reported fully in October.

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AMERICAN SCHOOL HEALTH ASSOCIATION

DENTISTS in Pennsylvania associated with or interested in the state program of dental health would profit by membership in the American School Health Association. This organization holds meetings each Fall at the same time and place as the American Public Health Association; the conventions are stimulating and valuable. Members of the Council on Dental Health of the State Society especially are urged to consider joining this group.

The *Journal of School Health* is included in the membership dues, which are $3.00 per year. A half-dozen articles in this journal last year were concerned directly with dentistry and dental problems in the school program. Also there were stimulating editorials, book reviews, and abstracts—all dealing with the general problem of better health for school children.

This announcement is being given editorial prominence because we think cooperation with and membership in this School Health group will be of distinct advantage to members of the State Society who wish to further dental health for children in Pennsylvania.

Details of membership will be provided by writing A. O. DeWeese, M.D., Secretary and Treasurer, Kent State University, Kent, Ohio.

Concerning Membership

RAY COBAUGH, EXECUTIVE SECRETARY

During this month, approximately two hundred fifty graduates from the Pennsylvania Dental schools will take examinations to practice dentistry in the Commonwealth. A large percentage of the successful candidates will remain within the state to begin the private practice of the profession. This fact imposes a responsibility and affords an opportunity to the appropriate dental societies to make an important contribution to the organized profession in Pennsylvania and the nation by enrolling these new men as members.

It is the responsibility of the local dental society in the community where these men locate to contact them and to do everything within reason to make the starting of their practice a pleasant experience. Especially since nearly all recent graduates are already members of the student ADA in the college units, the requirements for admission should be simple and the processing of the new memberships should be rapid.

Any opportunity to start this potential member of organized dentistry off on a friendly and easy basis should not be overlooked. He may not be fully aware of the low dues advantage that is his for the first calendar year after graduation. He may not be familiar with local customs or local government administration or ordinance that affect him. He is entitled to know these things and will eventually find them out, but if the local dental society tells him in advance and makes him aware of the many services available to him through the state and national societies, he will be very likely to begin a membership record that will be consistent and helpful to the profession. In his turn he will then be willing and able to make his contribution as he develops something worth while to offer.

Membership campaigns are not impossible to conduct effectively nor are the results always concealed and remote. An outstanding example of the proof of this statement is the activity of the Second District Dental Society this year. That organization secured from the state central office a list of all non-members within their area. This information was then passed on to the appropriate component officers with a request that a report be returned on each of the dentists who had failed to renew his membership application for the current year. The results were gratifying and today the Second District Society stands HIGHER in membership than the maximum attained last year.

This example is not meant to indicate that other districts have not put on campaigns requiring ingenuity and effort but it does show that good results are possible. There are, of course, many factors that will prevent the attainment of such spectacular results. There are some districts that are suffering from economic dislocations and stresses; there are others that are actually experiencing a decreasing population and therefore are not getting a proportionate number of the recent graduates. These factors must be taken into consideration in assaying the membership problem and the effectiveness of the solution.

The following tables represent information on the membership status of the Pennsylvania State Dental Society as of May 31.

Districts	*Maximum No. Members '49*	*Present Membership*	*Membership Year Ago*	*Percentage Ranking Compared with Maximum 1949 Membership*	
1	1,404	1,274	1,367	Second District	100.9 %
2	522	527	508	Fourth District	94.49 %
3	384	310	346	Tenth District	94.49 %
4	218	206	210	Sixth District	93.4 %
5	334	302	317	Seventh District	93.3 %
6	122	114	111	First District	90.7 %
7	242	226	233	Ninth District	90.6 %
8	95	86	85	Eighth District	90.5 %
9	277	251	271	Fifth District	90.4 %
10	1,308	1,236	1,240	Third District	80.7 %
Total	4,906	4,532	4,688	PENNSYLVANIA	92.4 %

The central office of the state society has much information that may be of value to local society officers. If you can use any facts that are on file in Harrisburg, they will be sent to you on request. On the other hand, if there is any information that you think ought to be compiled to assist districts in their membership campaigns, suggest it. It may be that what you want can be tabulated from facts already available or may suggest a new approach to membership programs and in this way another valuable service would come into existence.

217 State Street

THE STATE SOCIETY CENTRAL OFFICE

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217 STATE Street, Harrisburg, has come to mean a variety of things to members of the dental profession throughout Pennsylvania. To leaders in the early organization of the profession, 217 State Street means the change from a sprawling loose organization to a compact one. To younger men, in fact those in practice twelve years or less, 217 State Street is just taken for granted because it was always familiar to them as the home of the Pennsylvania State Dental Society.

But to be taken for granted, doesn't necessarily mean to be understood so the JOURNAL would like to take you on a visit to 217 State Street, Harrisburg—the administrative offices of the Pennsylvania State Dental Society.

The unobtrusive exterior of the original building which was once a one family dwelling has changed but little since it was purchased by the Pennsylvania State Dental Society twelve years ago or indeed since its erection some fifty years ago. The interior has been altered into modern offices as far as structural limitations would permit. Many of these changes were made when the building was first acquired but some have followed in later years to keep pace with changing requirements of the growing organization so that today, the Pennsylvania State Dental Society offices are modern, well lighted and well equipped.

But a story of things must eventually become a story of people, lest it has no savor and before we introduce the present staff we would like to note that much

of the present arrangements were brought under the direction of Doctor C. J. Hollister, who was Executive Secretary from 1936 until 1946.

The present Executive Secretary, Mr. Ray Cobaugh, was born in Johnstown, Pennsylvania, 1910. Shortly thereafter his family moved to Oklahoma where he spent his early childhood and entered grade school. Returning to Harrisburg he was enrolled in the public school system from which he graduated in 1929. After a somewhat interrupted college career he graduated from Elizabethtown College with an A.B. degree in 1935.

Immediately after college, Cobaugh went to New England where he worked in the construction industry throughout that area. Returning to Harrisburg in 1938 he became Secretary of the A. F. of L. Central Pennsylvania Building Trades Council where he did organizational, administrative, and legislative work. He held this post until 1942 when he resigned to accept a commission in the U. S. Navy. During his naval career he served as a gunnery officer in all theaters of the war and is presently a Lieutenant Commander in the U. S. Naval Reserve and Commanding Officer of a reserve unit in Harrisburg.

Upon being released from active duty in 1946, he was employed by the Board of Trustees of the Pennsylvania State Dental Society as Executive Secretary and has been with our organization since that time. Mr. Cobaugh lives in Harrisburg with his wife Ruth and their two children: Kay and Gerald.

The Administrative Assistant to Mr. Cobaugh, Mr. Ross Jenkyn, is a native Harrisburg man, having been born in that city in 1911. A product of the local public school system, he graduated from high school in 1929 and coincidentally in the same class with Mr. Cobaugh. From the time of his graduation until the outbreak of the recent war Jenkyn has been variously employed in the office supply and typewriter repair business and in the field of photographic supplies. Mr. Jenkyn is also a well known musician and photographer about the city of Harrisburg.

At the outbreak of the war, being refused for service because of a physical disability, Mr. Jenkyn was employed by the federal government in Washington. Here, in the capacity of a supervisor, he directed some fifty civilian employees who were doing photographic work in connection with map making. Jenkyn was employed by the Pennsylvania State Dental Society March, 1949.

A key position in the Central Office of the Pennsylvania State Dental Society is held by Mrs. Ann Bixler, (left, front office picture) our bookkeeper. Mrs. Bixler is also a native Harrisburger and a product of the local school system. She began working as a bookkeeper in 1931 for the United Ice and Coal Company of Harrisburg, remaining with this firm until 1939. From 1939 until 1942 she was employed by the Jackson Manufacturing Company and from 1942 until 1945 by the War Finance Division of the U. S. Treasury.

Ann came to work as Secretary to Mr. Cobaugh and bookkeeper for the Dental Society when Mr. Cobaugh first became Executive Secretary in 1946.

Her many contacts with dentists throughout the Commonwealth while serving in this capacity have made her one of the best known and most valuable figures in the administrative work of the Society.

Our stenographer, Mae Bittinger, (right, in front office picture) was born in Shamokin in 1921. Her family came to Harrisburg in her early childhood and she was enrolled in the public schools in that city, graduating in 1939. Shortly after graduation she became employed by the Harrisburg Bridge Company where she worked for two years.

In 1941, Mae married Lawrence Bittinger, a Harrisburg man. During the war she worked for the Red Cross at the Station Hospital, Fort Eustis, Virginia. Lawrence and Mae Bittinger with their seven-year-old son, Larry, reside in Harrisburg. Mrs. Bittinger was employed by the Pennsylvania State Dental Society September, 1949.

Several mechanical aids have been developed to assist in the service-to-members program of the Society. The filing system in the Central Office is handled with two principal units: a visible card index system and addressograph plates. The card system lists all registered dentists in Pennsylvania together with their membership, registration, date of birth, school, graduation date and other personal data immediately available. The file of addressograph plates contains names and current addresses of all present members; these are arranged alphabetically by towns in each district. From this file, a printed record of all the members of any town or district can be produced in a matter of minutes.

The files are closely correlated with the membership and dues records kept by the bookkeeper. Tabulations are made in such a manner that each dues remittance is recorded in ledger, card and addressograph plate form. A complete detail monthly report of membership and finances is published for distribution to the trustees and principal officers of the society.

The JOURNAL envelopes are addressographed each month in this office. Several smaller card files are used to keep such records as local, state and national contact men for political purposes; all hospital staff dentists in Pennsylvania and those participating in the Blue Shield Plan of the Medical Service Association of Pennsylvania, JOURNAL advertisers and similar limited specific information.

All mimeographing is done here in the

Central Office. The reports of all committees to the House of Delegates are reproduced and bound each year. A directory of clinicians and speakers has been recently produced and is ready for distribution to trustees, society secretaries and state officers.

To further assist in program development, a limited number of films are kept in the central office. These will be sent to any member without charge. A much larger library of films is available through the ADA at a small fee. A catalogue of these is on file in the central office and will be sent to district officers or members of the Council on Dental Health as revisions appear.

Meetings and other notices for various district and local societies are designed, reproduced and mailed from the Central Office at cost. This service is available to all component societies. Listings of all delinquent members are periodically furnished to district secretaries each year.

Since the objectives of the dental society are broad and long range, it is necessary to keep a great variety of records in addition to those kept for the efficient performance of routine functions. A considerable library of historical data is reposed in the central office. Through this material it is possible to trace the development of the practice of dentistry and of the organization of the profession in Pennsylvania since the first meetings were held in 1868. The History Committee of the State Society would welcome any additional material to these files such as programs, back numbers of journals or papers and copies of published proceedings.

Although this article is meant broadly to acquaint the members of the Pennsylvania State Dental Society with the functions and people of the central office, it is not suggested that all phases of activities have been covered and for this reason it is urged that members interested in making a contribution to the effective management of the society, stop in at 217 State Street and meet the people there; we assure you an informative and interesting visit.

THE NEW BOOKS

A TEXTBOOK OF ORAL HYGIENE AND PREVENTIVE DENTISTRY. By Russell W. Bunting, D.D.Sc., Professor of Dentistry and Dean of the School of Dentistry, University of Michigan, and seven collaborators. 240 pages, 134 illustrations and 1 plate in color. Price $5.00. Philadelphia: Lea & Febiger, 1950 (May).

This should not be mistaken for a textbook on periodontia; it is not suited for that purpose and was not intended as such by the author. The purpose, to use Bunting's own words, "is to present the field of preventive dentistry and to state such related factual data as have been supported by adequate scientific investigations." With prevention the current keynote of all health service, it is important that dentistry should be vitally interested in the development of ways of controlling disease within its special field of activity. This book is designed to stimulate such interest.

It is an excellent hand-book on the histology and physiology of the mouth and oral structures, together with the pathological conditions to which they may be subjected. The chapters on these subjects are concise and informative. The etiologic factors involved and the known methods of complete or partial prevention are well presented in the light of present-day knowledge.

There is a well written chapter by Dorothy G. Hard, D.D.S., M.S.P.H., on "Oral Prophylaxis" which describes the removal of concretions on the teeth, polishing tooth surfaces, restoration of faulty contacts, overhanging restorations, relief of undue stresses, instructions to the patient, and other measures frequently neglected by the dentist. The chapter on "Oral and Systemic Disease" by Lester R. Cahn, D.D.S., is controversial and will likely provoke considerable discussion. Nevertheless, it presents a commonsense approach to an everyday problem of the dentist. A rather detailed chapter on "Public Health Dentistry" by Jacob M. Wisan, D.D.S., M.S.P.H., describes the place of dentistry "within the sphere of public health." The final chapter on "The Dental Hygienist" is an interesting account of the history and development of the dental hygiene auxiliary movement. All seven collaborators are well selected and are persons of ability in their respective fields.

All in all, this is a comprehensive, authoritative, and well illustrated how-to-do-it book which is of the most practical value to every dentist in general or specialized practice, to dental hygienists, and to all others interested in the preservation of mouth health. It could well have a place in every dentist's library.

—C. W. HAGAN,
Pittsburgh.

A TEXTBOOK OF ORTHODONTIA. By Robert H. W. Strang, M.D., D.D.S. Director of courses in orthodontia in the extension teaching department of Temple University; former Director of courses in orthodontia in the extension teaching departments of Columbia University and the University of Toronto; Director of the Fones School of Dental Hygiene, University of Bridgeport; Co-editor of "The Angle Orthodontist"; Consulting Oral Surgeon to the Bridgeport Hospital, Bridgeport, Connecticut. Revised third edition. 1050 illustrations on 583 figures and 5 plates, 2 in color. Price $15.00. Philadelphia: Lea & Febiger, 1950 (May).

The third edition of Strang's *Text-Book of Orthodontia* follows seven years after the publication of the second edition. It presents many changes in technical procedures. These modifications are dictated by newer concepts on the growth of bone and the role of heredity as the determining factor in the growth of the maxilla and the mandible.

Strang's description of normal occlusion and his chapter on "The Natural Mechanics of the Human Denture" are recommended for diligent study. Much valuable material on endocrine glands has been added to the chapters on "Etiology." The chapter on "The Growth and Development of the Denture" is one of the best as it condenses under one heading the work of Brodie, Broadbent, Wylie, Sicher, Weinmann and others in a very understandable manner.

Under "Case Analysis for Classification," Strang has included the oriented profile roentgenogram and this chapter should be carefully studied by all orthodontists regardless of what type orthodontic appliance they use.

The greater portion of the text is given over to the treatment of mal-occlusion and the appliance therapy is restricted to the edgewise arch mechanism, which was the last of Edward H. Angle's contributions to orthodontics.

Clinical experience taught the author that muscle balance is the greatest stabilizer of any corrected mal-occlusion and he feels that the width across the mandibular canines found in the mal-occlusion should not be increased during treatment.

In addition to his own plans of treatment, Strang has outlined those of Charles H. Tweed in detail, and a plan of treatment for bi-maxillary protrusion cases advocated by Harry Bull. The treatment of cases requiring extraction of teeth is covered in minute detail and the indications and contra-indications for extractions is thoroughly discussed.

As in the two previous editions of *A Text-Book of Orthodontia,* the author has set down in detail each and every step required in the

intelligent use of the edgewise arch appliances. Strang has the ability to write in clear, understandable fashion and the third edition of his book is a valuable contribution to orthodontics. It contains much valuable material for all those interested in orthodontics.

—W. M. THOMPSON, JR.,
Pittsburgh.

ACRYLIC INLAYS, CROWNS AND BRIDGES. By Irwin Robert Levy, D.D.S., formerly Director, American Training Institute; Chief of Dental Clinic, Big Sisters Organization; Assistant dentist, Mt. Sinai Hospital, New York; Director, Dental Division, Eastern School for Physician's Aides; author of "Textbook for Dental Assistants." 128 pages, 151 illustrations. Price $3.75. Philadelphia: Lea & Febiger, 1950 (May).

The use of acrylics in modern dental practice is a subject of great controversy and in need of clarification. Levy has written a practical, well-illustrated book on the topic covering in detail the construction of acrylic inlays, jackets, crowns, and bridges. It is a concise, well written guide on the methods of procedure for those who use or want to use synthetic resins.

There is an interesting introductory chapter with a resume of events leading up to the discovery of acrylic resin and a discussion of the chemistry of the material and its properties.

Acrylic inlays are considered first, with emphasis on cavity preparation, construction of the pattern both direct and indirect—all in step-by-step detail. The method of hydrocolloid impression taking and the use of Dietrich's elastic impression material is explained fully, along with the making of the dies. A complete technic is described for acrylic jackets as well as methods of construction for gold thimble crowns, acrylic veneers, and dowel crowns for non-vital teeth. Proper advice is offered on the methods of restoring missing teeth by fixed bridges which reviews the various methods of constructing gold occlusals, trusses, and facings. A detailed account is presented for processing, flasking, finishing, polishing, and cementation. There is a chapter devoted to matching and reproducing color in teeth and a discussion of color distribution.

Levy shows a definite understanding of the dental plastic field and points the way for greater success by both general practitioner and specialist. This is an excellently written monograph in a fertile field about which too little has been previously written.

—CHARLES L. CUDEN,
Pittsburgh.

ROOT CANAL THERAPY. By Louis I. Grossman, D.D.S., Dr. med. dent., Assistant Professor of Oral Medicine, School of Dentistry, University of Pennsylvania. New, 3rd edition. 368 pages, 267 illustrations on 119 figures. Price $6.50. Philadelphia: Lea & Febiger, 1950 (January).

By now, Grossman's text on root canal therapy is an accepted and standard work. When the first edition was published, the author stated that "The dental profession has slowly come to realize that extraction is not the solution to the root canal problem. The physician, too, has learned that extraction is not the solution he had hoped it might be to those baffling cases in which oral focal infection was suspected. And the public has awakened to the realization that dental substitutes do not always function as well as natural teeth." This new third edition is still based on those statements and reflects the great progress that has been made in the field of endodontics during the past few years.

The chapter on "Pulpless Teeth and Focal Infection" is a well documented outline of the present status of the pulpless tooth. Clinical, roentgenologic, histologic, and bacteriologic studies are presented in such a manner to warrant the statement that "To hold the pulpless tooth to the criticism of the past would be unjustified."

Grossman, a practitioner, teacher, and researcher of wide renown, has rewritten a book, based on extensive and time-tried experience, that offers a clear, thorough understanding of the root canal problem and of its application in specific situations.

The text has been brought up-to-date in every respect. Special emphasis is placed on the numerous advances made in the use of antibiotic agents. The use of polyantibotic treatment—a suspension of penicillin, bacitracin, streptomycin, and caprylate sodium (PBSC)—having been phenomenally effective in infected root canals, is stressed particularly and explained in detail.

The major portion of the book is concerned with the *treatment* of pulpless teeth, but adequate consideration also is given to the *prevention* of pulp disease and to *pulp conservation* by capping and pulpotomy. In addition, the technic of immediate root resection is given in the fullest detail. A chapter on the treatment of deciduous teeth, by Elsie Gerlach, D.D.S., is included.

The aim of root canal therapy should be to retain the tooth not only with comfort, but also with safety to the patient; and root canal work must be done more adequately than in the past. A safe guide to this sounder practice will be found in this edition of Grossman's work. It is especially recommended to dentists who desire to improve this aspect of the health-service they offer their patients. —T. McB.

BACTERIAL INFECTION With Special Reference to Dental Practice. By J. L. T. Appleton, B.S., D.D.S., Sc.D., Professor of Bacteriopathology and Dean, School of Dentistry, University of Pennsylvania. Fourth edition. 644 pages, 108 illustrations and 5 plates, 4 in color. Price $10.00. Philadelphia: Lea & Febiger, 1950 (April).

It is always an advantage in reviewing a scientific text to know the purposes the author had in mind when he wrote or revised his work. Appleton, in this fourth edition of his well-known book, states his reasons for writing clearly. The text primarily is to aid the reader to form a comprehensive concept of infection; and secondarily, to point out wherever a knowledge of infection will help dental practitioners to realize their opportunities and their responsibilities, and to understand and to solve their problems. These aims have been accomplished in the present volume.

The clinical and laboratory experience necessary to an adequate understanding of infection is well summarized. On this common ground —the field of infection—where both dentist and physician meet, the same language should be used. The author shows this so well that all dentists and physicians should understand fully how bacteria produce disease and how the host is affected. Also, the work stresses how important and useful a knowledge of infection is to the dentist in the proper care of the mouth.

The first part of the text is planned to acquaint the reader with a certain minimum of information on the morphology, physiology, and ecology of bacteria. The subject of infection as an entity is treated in the second part. The third part presents a summary and an analysis of what is known about the common infections peculiar to, or peculiarly associated with, the oral cavity, from actinomycosis to whooping cough. Dental caries, periodontal disease, and focal infection are given adequate presentation with inclusion of considerable current fact and theory.

The number of references to recent publications indicates the thorough revision of the text in this 1950 edition. The results of research, investigation, and clinical application made since the previous edition appear to be included in this authoritative work; changes and additions are apparent in every chapter. A well organized and interestingly expressed text on bacterial infection awaits the reader of this book.—T. McB.

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INSTITUTE OFFERS COURSE

A course in diagnostic and surgical technics will be given by the New York Institute of Clinical Oral Pathology from October, 1950, until May, 1951, inclusive. The 8 sessions will be held on one Wednesday a month from 7: 30 to 10: 00 P. M. The course is approved by the State Education Department of the University of the State of New York and by the Veterans Administration.

Those interested should communicate with the executive secretary, 101 East 79th St., New York 21, N. Y.

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DEATHS

CLARK, E. A., Pittsburgh (Munhall); School of Dentistry, University of Pittsburgh, 1905; died June 9, aged 67.

KOONTZ, Harry F., Woodsfield, Ohio; School of Dentistry, University of Pennsylvania, 1897; retired in 1947 after 50 years of practice in Pittsburgh; president, Odontological Society of W. Pa., 1912; member of Pittsburgh's Academy of Dentistry; Fellow of the International College of Dentists; died June 13, aged 74.

COLVIN, Ronald B., Somerset; Baltimore College of Dental Surgery, University of Maryland, 1902; died December 20, aged 71.

EFFRON, Frank S., Philadelphia; Medico-Chirurgical College of Philadelphia, 1915; died December 28, aged 52.

HOBSON, John J., Bryn Mawr; School of Dentistry, University of Pennsylvania, 1935; died January 29, aged 39.

HORNER, Harry J., Pittsburgh; School of Dentistry, University of Pennsylvania, 1896; specialist in prosthetic dentistry; member of Academy of Denture Prosthetics, Pittsburgh Academy of Dentistry, International College of Dentists; practitioner at Pittsburgh for 50 years, retiring in 1945; a son, also a dentist, Stuart J. Horner, was associated with him in practice; died April 23, aged 79.

LONG, John M., Philadelphia; School of Dentistry, University of Pennsylvania, 1915; died January 24, aged 73.

McCLARTY, Daniel, Athens; Pennsylvania College of Dental Surgery, 1900; died December 28, aged 79.

O'HARA, Patrick J., Philadelphia; School of Dentistry, University of Pennsylvania, 1890; father of Bishop Gerald P. O'Hara, papal nuncio in Romania and former auxiliary bishop of Philadelphia; died May 15, aged 87.

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RADIATION BURNS

In the interest of collecting pertinent information on radiation injury, will anyone who has had any tissue injury that could be attributed to dental radiography, kindly complete the following form and mail to:

DR. WILLIAM J. UPDEGRAVE
Professor of Radiodontics
Temple University, School of Dentistry
Broad above Allegheny
Philadelphia 40, Pennsylvania

All information submitted will be held in strict confidence.

I would be willing to aid your study on Radiation Injury.

NAME .....

ADDRESS .....

AGE .....